If you are using a printed copy of this procedure, and not the on-screen version, then you <u>MUST</u> make sure the dates at the bottom of the printed copy and the on-screen version match.

The on-screen version of the Collider-Accelerator Department Procedure is the Official Version.

Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ

Training Office, Bldg. 911A.

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

4.120.12.h 12 O'clock (PEER 13) Oxygen Deficiency Hazard Tests

C-A-OPN	I Procedures in w	hich this Attachmen	t is used.
4.120.12			
	Hand Proce	essed Changes	
HPC No.	<u>Date</u>	Page Nos.	<u>Initials</u>
HPC No.	<u>Date</u>	Page Nos.	<u>Initials</u>
HPC No.	<u>Date</u>	Page Nos.	<u>Initials</u>
HPC No.	<u>Date</u>	Page Nos.	<u>Initials</u>
HPC No.	<u>Date</u>	Page Nos.	<u>Initials</u>
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4.120.12.h 12 O'clock (PEER 13) Oxygen Deficiency Hazard Tests

PASS ANNUAL ACCEPTANCE TEST PROTOCOL

Division A Software Filename and Checksum: Title:	Checksum:		
Division B Software Filename and Checksum: Title:	Checksum:		
Initial testing complete:			
Test Team Leader's Name (Print):	Life Number:		
Test Team Leader's Name (Sign):			
Acceptance test procedure complete (following repairs and retesting if required)	:		
Test Team Leader's Name (Print):	Life Number:		
Test Team Leader's Name (Sign):	Date://		
Test results reviewed by:			
Safety Section Head's Name (Print):	Life Number:		
Safety Section Head's Name (Sign):	Date://		
Test results accepted by Radiation Safety Committee:			
RSC Member's Name (Print):	Life Number:		
RSC Member's Name (Sign):	Date:/		

1.1 Conduct a visual check on Peer 13 Crash and Crash/ODH boxes following Table 1 below $\sqrt{\ }$ = ok. x = problem

ВС	V = 0K, X = P $OXES$	Varify			Crash/ODH	l boxes only		Vowier all
		Verify mechan	elec.	Divis	ion A	Divis	ion B	Verify all X's
CRASH	Crash/ODH	condn. ok	condn. ok	Lcd Rdg	Tp2 – Tp4 Vltg	Lcd Rdg	Tp2 – Tp4 Vltg	corrected
11CB1				N/A	N/A	N/A	N/A	
	11CB2			%	V	%	V	
11CB3				N/A	N/A	N/A	N/A	
	11CB4			%	V	%	V	
12XCB1				N/A	N/A	N/A	N/A	
	12XCB2			%	V	%	V	
	12XCB3			%	V	%	\mathbf{V}	
12XCB4				N/A	N/A	N/A	N/A	
	12XCB5			%	V	%	V	
	12CB1			%	V	%	\mathbf{V}	
12CB2				N/A	N/A	N/A	N/A	
	12CB3			%	V	%	\mathbf{V}	
	12CB4			%	V	%	V	

Table 1 – Summary of visual check on Crash and Crash/ODH boxes in Peer 13

1.2 Verification of valid calibration of ODH sensors in Peer 13, following Table 2 below $\sqrt{-}$ ok x = problem

ODH sensor	Verify valid calibration	Record calibration date	Verify all x's corrected	Record new calibration date
11AS1		/		
11AS2		/		
12XAS1		/		
12XAS2		/		
12XAS3		/		
12AS1				
12AS2				
12AS3				

Table 2 – Verification of valid calibration of ODH sensors in Peer 13

1.3 Test of ODH sensor 11AS1 in 11CB2

	П	PLACE VERIFY	Peer 13 in Mode 8 Peer 13 is in Restricted Access	MODE 8
	_			
		FLOW RECORD	Helium (or Nitrogen) gas across 11AS1 Oxygen trip level for Div A	%
		RECORD	Oxygen trip level for Div B	
		VERIFY	MCR sees 11AS1 Div A	TRIPPED 70
		VERIFY	MCR sees 11AS1 Div B	TRIPPED
		VERIFY	Div A & B strobes on 11CB2 are	FLASHING
		VERIFY	Div A & B sonalerts on 11CB2 are	SOUNDING
		VERIFY	Fan 11EF2 is	ON
		VERIFY	Vent 11AV1 is	OPEN
		VERIFY	Vent 11AV2 is	OPEN
		HALT	Flow of gas on 11AS1	
		WAIT	For 11AS1 to clear (level ~ trip-level above)	
		VERIFY	Div A & B strobes and sonalerts on 11CB2 are	OFF
		VERIFY	Fan 11EF2 is	OFF
		VERIFY	Vent 11AV1 is	CLOSED
		VERIFY	Vent 11AV2 is	CLOSED
		RESET	ODH in MCR	
		VERIFY	MCR sees ODH as	RESET
1.4		Test of ODH	sensor 11AS2 in 11CB4	
		PLACE	Peer 13 in Mode 8	
		VERIFY	Peer 13 is in Restricted Access	MODE 8
		FLOW	Helium (or Nitrogen) gas across 11AS2	
		RECORD	Oxygen trip level for Div A	9/0
		RECORD	Oxygen trip level for Div B	%
		VERIFY	MCR sees 11AS2 Div A	TRIPPED
		VERIFY	MCR sees 11AS2 Div B	TRIPPED
		VERIFY	Div A & B strobes on 11CB4 are	FLASHING
		VERIFY	Div A & B sonalerts on 11CB4 are	SOUNDING
		VERIFY	Fan 12XEF1is	ON
		VERIFY VERIFY	Vent 11AV2 is Vent 11AV3 is	OPEN OPEN
	П	VEXIF 1	Vent IIAV3 is	OFEN
		HALT	Flow of gas on 11AS2	
		WAIT	For 11AS2 to clear (level ~ trip-level above)	
		VERIFY	Div A & B strobes and sonalerts on 11CB4 are	OFF
		VERIFY	Fan 12XEF1 is	OFF
		VERIFY	Vent 11AV2 is	CLOSED
		VERIFY	Vent 11AV3 is	CLOSED
		RESET	ODH in MCR	
		VERIFY	MCR sees ODH as	RESET
		Check f	or Test Acceptance of sensor 11AS2	
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_				December 8, 2004

1.5	Test of ODH	sensor 12XAS1 in 12XCB2	
	PLACE	Peer 13 in Mode 8	
	□ VERIFY	Peer 13 is in Restricted Access	MODE 8
	FLOW	Helium (or Nitrogen) gas across 12XAS1	
	RECORD	Oxygen trip level for Div A	
	RECORD	Oxygen trip level for Div B	%
	\Box VERIFY	MCR sees 12XAS1 Div A	TRIPPED
	\Box VERIFY	MCR sees 12XAS1 Div B	TRIPPED
	\Box VERIFY	Div A & B strobes on 12XCB2 are	FLASHING
	\Box VERIFY	Div A & B sonalerts on 12XCB2 are	SOUNDING
	\Box VERIFY	Fan 12XEF1 is	ON
	\Box VERIFY	Vent 11AV2 is	OPEN
	□ VERIFY	Vent 11AV3 is	OPEN
	HALT	Flow of gas on 12XAS1	
	WAIT	For 12XAS1 to clear (level ~ trip-level above)	
	□ VERIFY	Div A & B strobes and sonalerts on 12XCB2 are	OFF
	VERIFY	Fan 12XEF1 is	ON
	VERIFY	Vent 11AV2 is	CLOSED
	□ VERIFY	Vent 11AV3 is	CLOSED
	RESET	ODH in MCR	
	□ VERIFY	MCR sees ODH as	RESET
		For Test Acceptance of sensor 12XAS1	
1.6		sensor 12XAS2 in 12XCB3	
	PLACE	Peer 13 in Mode 8	MODE
	□ VERIFY	Peer 13 is in Restricted Access	MODE 8
	FLOW	Helium (or Nitrogen) gas across 12XAS2	
	RECORD	Oxygen trip level for Div A	%
	RECORD	Oxygen trip level for Div B	%
	\Box VERIFY	MCR sees 12XAS2 Div A	TRIPPED
	\Box VERIFY	MCR sees 12XAS2 Div B	TRIPPED
	\Box VERIFY	Div A & B strobes on 12XCB3 are	FLASHING
	\Box VERIFY	Div A & B sonalerts on 12XCB3 are	SOUNDING
	\Box VERIFY	Fan 12XEF2 is	ON
	\Box VERIFY	Vent 12AV1 is	OPEN
	□ VERIFY	Vent 12AV2 is	OPEN
	HALT	Flow of gas on 12XAS2	
	WAIT	For 12XAS2 to clear (level ~ trip-level above)	
	□ VERIFY	Div A & B strobes and sonalerts on 12XCB3 are	OFF
	\Box VERIFY	Fan 12XEF2 is	OFF
	\Box VERIFY	Vent 12AV1 is	CLOSED
	□ VERIFY	Vent 12AV2 is	CLOSED
	RESET	ODH in MCR	
	□ VERIFY	MCR sees ODH as	RESET
	□ Check f	For Test Acceptance of sensor 12XAS2	

1.7		sensor 12AS1 in 12CB1	
	PLACE	Peer 13 in Mode 8	
	□ VERIFY	Peer 13 is in Restricted Access	MODE 8
	FLOW	Helium (or Nitrogen) gas across 12AS1	
	RECORD	Oxygen trip level for Div A	%
	RECORD	Oxygen trip level for Div B	%
	\Box VERIFY	MCR sees 12AS1 Div A	TRIPPED
	\Box VERIFY	MCR sees 12AS1 Div B	TRIPPED
	\Box VERIFY	Div A & B strobes on 12CB1 are	FLASHING
	\Box VERIFY	Div A & B sonalerts on 12CB1 are	SOUNDING
	\Box VERIFY	Fan 12XEF2 is	ON
	\Box VERIFY	Vent 12AV1 is	OPEN
	□ VERIFY	Vent 12AV2 is	OPEN
	HALT	Flow of gas on 12AS1	
	WAIT	For 12AS1 to clear (level ~ trip-level above)	
	□ VERIFY	Div A & B strobes and sonalerts on 12CB1 are	OFF
	\Box VERIFY	Fan 12XEF2 is	OFF
	\Box VERIFY	Vent 12AV1 is	CLOSED
	□ VERIFY	Vent 12AV2 is	CLOSED
	RESET	ODH in MCR	
	□ VERIFY	MCR sees ODH as	RESET
1.8		For Test Acceptance of sensor 12AS1 sensor 12AS2 in 12CB3	
1.0	PLACE	Peer 13 in Mode 8	
	□ VERIFY	Peer 13 is in Restricted Access	MODE 8
	U VERIII	Teel to its in Restricted Recess	WODE
	FLOW	Helium (or Nitrogen) gas across 12AS2	
	RECORD	Oxygen trip level for Div A	%
	RECORD	Oxygen trip level for Div B	<u></u>
	\Box VERIFY	MCR sees 12AS2 Div A	TRIPPED
	□ VERIFY	MCR sees 12AS2 Div B	TRIPPED
	□ VERIFY	Div A & B strobes on 12CB3 are	FLASHING
	□ VERIFY	Div A & B sonalerts on 12CB3 are	SOUNDING
	□ VERIFY	Fan 12EF1 is	ON
	□ VERIFY	Vent 12AV2 is	OPEN
	□ VERIFY	Vent 12AV3 is	OPEN
	HALT	Flow of gas on 12AS2	
	WAIT	For 12AS2 to clear (level ~ trip-level above)	
	□ VERIFY	Div A & B strobes and sonalerts on 12CB3 are	OFF
	\Box VERIFY	Fan 12EF1 is	OFF
	\Box VERIFY	Vent 12AV2 is	CLOSED
	□ VERIFY	Vent 12AV3 is	CLOSED
	RESET	ODH in MCR	
	\Box VERIFY	MCR sees ODH as	RESET
	□ Check f	For Test Acceptance of sensor 12AS2	

1.9 Test of ODH sensor 12AS3 in 12CB4

		PLACE VERIFY	Peer 13 in Mode 8 Peer 13 is in Restricted Access	MODE 8
		EI OW	H-P (N'4) 124.62	
		FLOW RECORD	Helium (or Nitrogen) gas across 12AS3 Oxygen trip level for Div A	%
		RECORD	Oxygen trip level for Div B	
		VERIFY	MCR sees 12AS3 Div A	TRIPPED 70
		VERIFY	MCR sees 12AS3 Div B	TRIPPED
		VERIFY	Div A & B strobes on 12CB4 are	FLASHING
		VERIFY	Div A & B sonalerts on 12CB4 are	SOUNDING
		VERIFY	Fan 1EF1 is	ON
		VERIFY	Vent 12AV3 is	OPEN
		VERIFY	Vent 1AV1 is	OPEN
		HALT	Flow of gas on 12AS3	
		WAIT	For 12AS3 to clear (level ~ trip-level above)	
		VERIFY	Div A & B strobes and sonalerts on 12CB4 are	OFF
		VERIFY	Fan 1EF1 is	OFF
		VERIFY	Vent 12AV3 is	CLOSED
		VERIFY	Vent 1AV1 is	CLOSED
		RESET	ODH in MCR	
		VERIFY	MCR sees ODH as	RESET
1.10			or Test Acceptance of sensor 12AS3 etivation test of sensor 11AS1 in sector 11	
2,20				
	_	PLACE	Peer 13 in Mode 8	MODE 0
		VERIFY	Peer 13 is in Restricted Access	MODE 8
		JUMPER	Tp2 and Tp4 on the Div A pcb in 11CB2	
		JUMPER	Tp2 and Tp4 on the Div B pcb in 11CB2	
		VERIFY	MCR sees Peer 13 is in	MODE 2
		VERIFY	MCR sees 11AS1 Div A	TRIPPED
		VERIFY	MCR sees 11AS1 Div B	TRIPPED
		VERIFY	Fan 11EF2 is immediately	ON
		VERIFY	Vent 11AV1 is immediately	OPEN
		VERIFY	Vent 11AV2 is immediately	OPEN
		AFTER	~ 30 secs	
		TURN	Bypass Switch to Bypass	
		VERIFY	Strobes \square , Sonalerts \square and Fans (after ~90secs) \square	STOP
	_	TURN	Bypass Switch from Bypass	
		VERIFY	Strobes \square , Sonalerts \square and Fans (after ~30secs) \square	CONTINUE
		BEGIN	10-minute timer	

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RECORD	Volume of air-flow at the inlet of fan 11EF2 $Target\ flow\ value\ (\pm 10\%)$	LFM 1592 LFM
VERIFY VERIFY	Air flow at tell-tale of vent 11AV1 is Air flow at tell-tale of vent 11AV2 is	ADEQUATE ADEQUATE
AFTER RECORD	~ 10 minutes Duration of timer	mins
VERIFY VERIFY VERIFY VERIFY VERIFY VERIFY	Fan 10EF1 is Fan 11EF1 is Fan 12XEF1 is Vent 10AV1 is Vent 10AV2 is Vent 10AV3 is Vent 10AV4 is	ON ON ON OPEN OPEN OPEN OPEN
REMOVE REMOVE	Jumper between Tp2 and Tp4 on the Div A pcb in 11CB2 Jumper between Tp2 and Tp4 on the Div B pcb in 11CB2	
VERIFY VERIFY VERIFY	Fan 11EF2 is Vent 11AV1 is Vent 11AV2 is	OFF CLOSED CLOSED
VERIFY VERIFY VERIFY VERIFY VERIFY VERIFY	Fan 10EF1 is Fan 11EF1 is Fan 12XEF1 is Vent 10AV1 is Vent 10AV2 is Vent 10AV3 is Vent 10AV4 is	OFF OFF CLOSED CLOSED CLOSED CLOSED
RESET VERIFY	ODH in MCR MCR sees ODH as	RESET

 $[\]Box$ Check for Test Acceptance of sensor 11AS1 on for > 10 minutes

1.11	Test Activati	on of multiple sensors, 11AS2 and 12XAS1, in sector 11	
	PLACE	Peer 13 in Mode 8	
	VERIFY	Peer 13 is in Restricted Access	MODE 8
	JUMPER	Tp2 and Tp4 on the Div A pcb in 11CB4	
	JUMPER	Tp2 and Tp4 on the Div B pcb in 11CB4	
	JUMPER	Tp2 and Tp4 on the Div A pcb in 12XCB2	
	JUMPER	Tp2 and Tp4 on the Div B pcb in 12XCB2	
	VERIFY	MCR sees Peer 13 is in	MODE 2
	VERIFY	MCR sees 11AS2 Div A	TRIPPED
	VERIFY	MCR sees 11AS2 Div B	TRIPPED
	VERIFY	MCR sees 12XAS1 Div A	TRIPPED
	VERIFY	MCR sees 12XAS1 Div B	TRIPPED
	VERIFY	Fan 10EF1 is	ON
	VERIFY	Fan 11EF1 is	ON
	VERIFY	Fan 11EF2 is	ON
	VERIFY	Fan 12XEF1 is	ON
	VERIFY	Vent 10AV1 is	OPEN
	VERIFY	Vent 10AV2 is	OPEN
	VERIFY	Vent 10AV3 is	OPEN
	VERIFY	Vent 10AV4 is	OPEN
	VERIFY	Vent 11AV1 is	OPEN
	VERIFY	Vent 11AV2 is	OPEN
	VERIFY	Vent 11AV3 is	OPEN
	AFTER	~ 30 secs	
	TURN	Bypass Switch to Bypass	
	VERIFY	Strobes \square , Sonalerts \square and Fans (after ~90secs) \square	STOP
	TURN	Bypass Switch from Bypass	
	VERIFY	Strobes \Box , Sonalerts \Box and Fans (after ~30secs) \Box	CONTINUE
	REMOVE	Jumper between Tp2 and Tp4 on the Div A pcb in 11CB2	
	REMOVE	Jumper between Tp2 and Tp4 on the Div B pcb in 11CB2	
	REMOVE	Jumper between Tp2 and Tp4 on the Div A pcb in 11CB4	
	REMOVE	Jumper between Tp2 and Tp4 on the Div B pcb in 11CB4	
	VERIFY	Fan 10EF1 is	OFF
	VERIFY	Fan 11EF1 is	OFF
	VERIFY	Fan 11EF2 is	OFF
	VERIFY	Fan 12XEF1 is	OFF
	VERIFY	Vent 10AV1 is	CLOSED
	VERIFY	Vent 10AV2 is	CLOSED
	VERIFY	Vent 10AV3 is	CLOSED
	VERIFY	Vent 10AV4 is	CLOSED
	VERIFY	Vent 11AV1 is	CLOSED
	VERIFY	Vent 11AV2 is	CLOSED
	VERIFY	Vent 11AV3 is	CLOSED
	RESET	ODH in MCR	
	VERIFY	MCR sees ODH as	RESET

 $^{\ \}square$ Check for Test Acceptance of Activation of multiple sensors 11AS2 and 12XAS1 in sector 11

1.12 10-minute Activation test of sensor 12XAS2 in sector 12

PLACE VERIFY	Peer 13 in Mode 8 Peer 13 is in Restricted Access	MODE 8
JUMPER JUMPER	Tp2 and Tp4 on the Div A pcb in 12XCB3 Tp2 and Tp4 on the Div B pcb in 12XCB3	
VERIFY VERIFY VERIFY VERIFY VERIFY	MCR sees Peer 13 is in MCR sees 12XAS2 Div A MCR sees 12XAS2 Div B Fan 12XEF2 is immediately Vent 12AV1 is immediately Vent 12AV2 is immediately	MODE 2 TRIPPED TRIPPED ON OPEN OPEN
AFTER	~ 30 secs	
 TURN VERIFY TURN VERIFY BEGIN	Bypass Switch to Bypass Strobes □, Sonalerts □ and Fans (after ~90secs) □ Bypass Switch from Bypass Strobes □, Sonalerts □ and Fans (after ~30secs) □ 10-minute timer	STOP CONTINUE
RECORD	Volume of air-flow at the upper inlet of fan 12XEF2 Target flow value ($\pm 10\%$) is the sum of both ducts	LFM
VERIFY VERIFY	Air-flow at tell-tale of vent 12AV1 is Air-flow at tell-tale of vent 12AV2 is	ADEQUATE ADEQUATE
AFTER RECORD	~ 10 minutes Duration of timer	mins
		mins ON ON ON ON ON ON OPEN OPEN OPEN OPEN
VERIFY VERIFY VERIFY VERIFY VERIFY VERIFY VERIFY	Pan 1EF1 is Fan 1EF2 is Fan 1EF3 is Fan 1EF4 is Fan 12EF1 is Vent 1AV1 is Vent 1AV2 is Vent 1AV3 is	ON ON ON ON ON OPEN OPEN OPEN
VERIFY VERIFY VERIFY VERIFY VERIFY VERIFY VERIFY VERIFY VERIFY REMOVE	Fan 1EF1 is Fan 1EF2 is Fan 1EF3 is Fan 1EF4 is Fan 12EF1 is Vent 1AV1 is Vent 1AV2 is Vent 1AV3 is Vent 12AV3 is Jumper between Tp2 and Tp4 on the Div A pcb in 12XCB3	ON ON ON ON ON OPEN OPEN OPEN

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		VERIFY VERIFY VERIFY VERIFY RESET	Vent 1AV1 is Vent 1AV2 is Vent 1AV3 is Vent 12AV3 is ODH in MCR	CLOSED CLOSED CLOSED
		VERIFY	MCR sees ODH as	RESET
		Check fo	r Test Acceptance of sensor 12XAS2 on for > 10 m	inutes
1.13			n of multiple sensors, 12AS2 and 12AS3, in sector	12
		PLACE VERIFY	Peer 13 in Mode 8 Peer 13 is in Restricted Access	MODE 8
		JUMPER JUMPER JUMPER JUMPER	Tp2 and Tp4 on the Div A pcb in 12CB3 Tp2 and Tp4 on the Div B pcb in 12CB3 Tp2 and Tp4 on the Div A pcb in 12CB4 Tp2 and Tp4 on the Div B pcb in 12CB4	
		VERIFY	MCR sees Peer 13 is in	MODE 2
		VERIFY	MCR sees 12AS2 Div A	TRIPPED
		VERIFY	MCR sees 12AS2 Div B	TRIPPED
		VERIFY	MCR sees 12AS3 Div A	TRIPPED
		VERIFY	MCR sees 12AS3 Div B	TRIPPED
		VERIFY	Fan 1EF1 is	ON
		VERIFY	Fan 1EF2 is	ON
		VERIFY	Fan 1EF3 is	ON
		VERIFY	Fan 1EF4 is	ON
		VERIFY	Fan 12EF1 is	ON
		VERIFY	Fan 12XEF1 is	ON
		VERIFY	Vent 1AV1 is	OPEN
		VERIFY	Vent 1AV2 is	OPEN
		VERIFY	Vent 1AV3 is	OPEN
		VERIFY	Vent 12AV1 is	OPEN
		VERIFY	Vent 12AV2 is	OPEN
		VERIFY	Vent 12AV3 is	OPEN
		AFTER	~ 30 secs	
		TURN	Bypass Switch to Bypass	
		VERIFY	Strobes □, Sonalerts □ and Fans (after ~90secs) □	STOP
		TURN	Bypass Switch from Bypass	
		VERIFY	Strobes \square , Sonalerts \square and Fans (after ~30secs) \square	CONTINUE
		REMOVE REMOVE REMOVE	Jumper between Tp2 and Tp4 on the Div A pcb in Jumper between Tp2 and Tp4 on the Div B pcb in Jumper between Tp2 and Tp4 on the Div A pcb in Jumper between Tp2 and Tp4 on the Div B pcb in	112XCB3 12XCB3
		VERIFY	Fan 1EF1 is	OFF
		VERIFY	Fan 1EF2 is	OFF
		VERIFY	Fan 1EF3 is	OFF
		VERIFY	Fan 1EF4 is	OFF
		VERIFY	Fan 12EF1 is	OFF
. .				
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		VERIFY	Fan 12XEF1 is	OFF
		VERIFY	Vent 1AV1 is	CLOSED
		VERIFY	Vent 1AV2 is	CLOSED
		VERIFY	Vent 1AV3 is	CLOSED
		VERIFY	Vent 12AV1 is	CLOSED
		VERIFY	Vent 12AV2 is	CLOSED
		VERIFY	Vent 12AV3 is	CLOSED
		RESET	ODH in MCR	
		VERIFY	MCR sees ODH as	RESET
		Check fo	or Test Acceptance of Activation of multiple sensors 12AS2 and 12AS3	in sector 12
1.14		Test Manual f	fan ON/OFF controls in Alcove 11C	
		PLACE	Peer 13 in Mode 8	
		VERIFY	Peer 13 is in Restricted Access	MODE 8
		PRESS	Fan ON button in Alcove 1C	
		BEGIN	90-sec timer	
	П	VERIFY	Fan 11EF2 is	ON
	П	VERIFY	Vent 11AV1 is	OPEN
	П	VERIFY	Vent 11AV2 is	OPEN
	П	VERIFY	Vent 11AV3 is	OPEN
	ш	V EXXII	VOIR III VO IS	OLLIV
		PRESS	Fan OFF button in Alcove 1C	
		AFTER	90 secs from ON command	
		VERIFY	Fan 11EF2 is	OFF
		VERIFY	Vent 11AV1 is	CLOSED
		VERIFY	Vent 11AV2 is	CLOSED
		VERIFY	Vent 11AV3 is	CLOSED

	PL	ACE	Peer 13 in Mode 8	
	□ VE	RIFY	Peer 13 is in Restricted Access	MODE 8
	PR	ESS	Fan ON button in Experimental area fan control box	
		GIN	90-sec timer	
	□ VE	RIFY	Fan 12XEF1 is	ON
	\Box VE	RIFY	Vent 11AV2 is	OPEN
	□ VE	RIFY	Vent 11AV3 is	OPEN
	RE	CORD	Volume of air-flow at the inlet of fan 12XEF1	LFM
			Target flow value ($\pm 10\%$)	2078 LFM
		RIFY	Air flow at tell-tale of vent 11AV3 is	ADEQUATE
	PR	ESS	Fan OFF button in CCW Experimental area fan control box	
	AF	TER	90 secs from ON command	
	□ VE	RIFY	Fan 12XEF1 is	OFF
	\Box VE	RIFY	Vent 11AV2 is	CLOSED
	\Box VE	RIFY	Vent 11AV3 is	CLOSED
1.16	Test	Manual	fan ON/OFF controls at CW Experimental area fan control box	
	PI.	ACE	Peer 13 in Mode 8	
		RIFY	Peer 13 is in Restricted Access	MODE 8
		ESS	Fan ON button in Experimental area fan control box	
	BE	GIN	90-sec timer	
	\Box VE	RIFY	Fan 12XEF2 is	ON
		RIFY	Vent 12AV1 is	OPEN
	□ VE	RIFY	Vent 12AV2 is	OPEN
	PR	ESS	Fan OFF button in CCW Experimental area fan control box	
	AF	TER	90 secs from ON command	
	□ VE	RIFY	Fan 12XEF2 is	OFF
	_	RIFY	Vent 12AV1 is	CLOSED
		RIFY	Vent 12AV2 is	CLOSED
		Check for	or Test Acceptance of Manual fan ON/OFF controls at CW Experi	mental area fan

Test Manual fan ON/OFF controls at CCW Experimental area fan control box

1.15

1.17 Test Manual fan ON/OFF controls in Alcove 1A

PLACE VERIFY	Peer 13 in Mode 8 Peer 13 is in Restricted Access	MODE 8
PRESS BEGIN	Fan ON button in Alcove 1A 90-sec timer	
VERIFY VERIFY VERIFY VERIFY VERIFY	Fan 1EF1 is Fan 12EF1 is Vent 1AV1 is Vent 12AV1 is Vent 12AV2 is Vent 12AV3 is	ON ON OPEN OPEN OPEN OPEN
RECORD RECORD	Volume of air-flow at the inlet of fan 12EF1 $Target\ flow\ value\ (\pm10\%)$ Volume of air-flow at the inlet of fan 1EF1	LFM LFM
VERIFY VERIFY	Target flow value ($\pm 10\%$) Air flow at tell-tale of vent 1AV1 is Air flow at tell-tale of vent 12AV3 is	1592 LFM ADEQUATE ADEQUATE
PRESS AFTER	Fan OFF button in Alcove 1A 90 secs from ON command	
VERIFY VERIFY VERIFY VERIFY VERIFY	Fan 1EF1 is Fan 12EF1 is Vent 1AV1 is Vent 12AV1 is Vent 12AV2 is Vent 12AV3 is	OFF OFF CLOSED CLOSED CLOSED CLOSED

[☐] Check for Test Acceptance of Manual fan ON/OFF controls in Alcove 1A

1.18 Test Manual fan ON/OFF controls in Alcove 1B

PLACE VERIFY	Peer 13 in Mode 8 Peer 13 is in Restricted Access	MODE 8
PRESS BEGIN	Fan ON button in Alcove 1B 90-sec timer	
VERIFY VERIFY VERIFY VERIFY VERIFY	Fan 1EF1 is Fan 12EF1 is Vent 1AV1 is Vent 12AV1 is Vent 12AV2 is Vent 12AV3 is	ON ON OPEN OPEN OPEN OPEN
PRESS AFTER	Fan OFF button in Alcove 1B 90 secs from ON command	
VERIFY VERIFY VERIFY VERIFY VERIFY	Fan 1EF1 is Fan 12EF1 is Vent 1AV1 is Vent 12AV1 is Vent 12AV2 is Vent 12AV3 is	OFF OFF CLOSED CLOSED CLOSED CLOSED

☐ Check for Test Acceptance of Manual fan ON/OFF controls in Alcove 1B

1.19 Test of Manual fan OFF controls in MCR

PRESS PRESS PRESS PRESS	Fan ON button in Alcove 1A Fan ON button in Alcove 11C Fan ON button in CW Experimental area Fan ON button in CCW Experimental area	
BEGIN	90-sec timer	
VERIFY	Fan 1EF1 is	ON
VERIFY	Fan 11EF2 is	ON
VERIFY	Fan 12EF1 is	ON
VERIFY	Fan 12XEF1 is	ON
VERIFY	Fan 12XEF2 is	ON
VERIFY	Vent 1AV1 is	OPEN
VERIFY	Vent 11AV1 is	OPEN
VERIFY	Vent 11AV2 is	OPEN
VERIFY	Vent 11AV3 is	OPEN
VERIFY	Vent 12AV1 is	OPEN
VERIFY	Vent 12AV2 is	OPEN
VERIFY	Vent 12AV3 is	OPEN
PRESS	Fan OFF button in MCR	
AFTER	90 secs from ON command	

VERIFY	Fan 1EF1 is Fan 11EF2 is Fan 12EF1 is Fan 12XEF1 is Fan 12XEF2 is Vent 1AV1 is Vent 11AV1 is Vent 11AV2 is Vent 11AV3 is Vent 12AV1 is	OFF OFF OFF OFF CLOSED CLOSED CLOSED CLOSED CLOSED
VERIFY VERIFY VERIFY	Vent 12AV1 is Vent 12AV2 is Vent 12AV3 is	CLOSED CLOSED CLOSED

☐ Check for Test Acceptance of Manual fan OFF controls in MCR

1.20 Test of Emergency fan ON/OFF controls at 12GE1

	PRESS	Emergency fan ON button at gate 12GE1	
	BEGIN	90-sec timer	
	VERIFY	Fan 1EF1 is	ON
	VERIFY VERIFY	Fan 11EF2 is Fan 12EF1 is	ON ON
П	VERIFY	Fan 12XEF1 is	ON ON
	VERIFY	Fan 12XEF2 is	ON
	VERIFY	Vent 1AV1 is	OPEN
П	VERIFY	Vent 11AV1 is	OPEN
	VERIFY	Vent 11AV2 is	OPEN
	VERIFY	Vent 11AV3 is	OPEN
	VERIFY	Vent 12AV1 is	OPEN
	VERIFY	Vent 12AV2 is	OPEN
	VERIFY	Vent 12AV3 is	OPEN
	PRESS AFTER	Emergency fan OFF button at gate 12GE1 90 secs from ON command	
	VERIFY	Fan 1EF1 is	OFF
	VERIFY	Fan 11EF2 is	OFF
	VERIFY	Fan 12EF1 is	OFF
	VERIFY	Fan 12XEF1 is	OFF
	VERIFY	Fan 12XEF2 is	OFF
	VERIFY	Vent 1AV1 is	CLOSED
	VERIFY	Vent 11AV1 is	CLOSED
	VERIFY	Vent 11AV2 is	CLOSED
	VERIFY	Vent 11AV3 is	CLOSED
		1 1	
	VERIFY	Vent 12AV1 is	CLOSED
		1 1	

☐ Check for Test Acceptance of Emergency fan OFF controls at gate 12GE1

1.21 Test MCR reset of Emergency fan ON/OFF controls at 12GE1

PRESS	Emergency fan ON button at gate 12GE1	
BEGIN	90-sec timer	
VERIFY	Fan 1EF1 is	ON
VERIFY	Fan 11EF2 is	ON
VERIFY	Fan 12EF1 is	ON
VERIFY	Fan 12XEF1 is	ON
VERIFY	Fan 12XEF2 is	ON
VERIFY	Vent 1AV1 is	OPEN
VERIFY	Vent 11AV1 is	OPEN
VERIFY	Vent 11AV2 is	OPEN
VERIFY	Vent 11AV3 is	OPEN
VERIFY	Vent 12AV1 is	OPEN
VERIFY	Vent 12AV2 is	OPEN
VERIFY	Vent 12AV3 is	OPEN
PRESS	Emergency fan OFF button at MCR	
AFTER	90 secs from ON command	
VERIFY	Fan 1EF1 is	OFF
VERIFY	Fan 11EF2 is	OFF
VERIFY	Fan 12EF1 is	OFF
VERIFY	Fan 12XEF1 is	OFF
VERIFY	Fan 12XEF2 is	OFF
VERIFY	Vent 1AV1 is	CLOSED
VERIFY	Vent 11AV1 is	CLOSED
VERIFY	Vent 11AV2 is	CLOSED
VERIFY	Vent 11AV3 is	CLOSED
VERIFY	Vent 12AV1 is	CLOSED
VERIFY	Vent 12AV2 is	CLOSED
VERIFY	Vent 12AV3 is	CLOSED

[☐] Check for Test Acceptance of MCR reset of Emergency fan ON/OFF at gate 12GE1

1.22 Test of ODH sensor 12XAS3 in 12XCB5 in service Building 1012A

PLACE	Peer 13 in Mode 8	
VERIFY	Peer 13 is in Restricted Access	MODE 8
FLOW	Helium (or Nitrogen) gas across 12XAS3	
RECORD	Oxygen trip level for Div A	%
RECORD	Oxygen trip level for Div B	%
VERIFY	MCR sees 12XAS3 Div A	TRIPPED
VERIFY	MCR sees 12XAS3 Div B	TRIPPED
VERIFY	Div A & B strobes on 12XCB5 are	FLASHING
VERIFY	Div A & B sonalerts on 12XCB5 are	SOUNDING
VERIFY	Fan in 1012A is	ON
VERIFY	Vent in 1012A is	OPEN
AFTER	~ 30 secs	
TURN	Bypass Switch to Bypass	
VERIFY	Strobes □, Sonalerts □ and Fans (after ~90secs) □	STOP
TURN	Bypass Switch from Bypass	
VERIFY	Strobes \square , Sonalerts \square and Fans (after ~30secs) \square	CONTINUE
HALT	Flow of gas on 12XAS3	
WAIT	For 12XAS3 to clear (level ~ trip-level above)	
VERIFY	Div A & B strobes and sonalerts on 12XCB5 are	OFF
VERIFY	Fan in 1012A is	OFF
VERIFY	Vent in 1012A is	CLOSED
RESET	ODH in MCR	
VERIFY	MCR sees ODH as	RESET

[☐] Check for Test Acceptance of sensor 12XAS3 in 12XCB5 in service Building 1012A

1.23	Summary of	air flow at fan intakes and vents in sector 12	
	RECORD	Volume of air-flow at the inlet of fan 11EF2	LFM
		Target flow value ($\pm 10\%$)	1592 LFM
	VERIFY	Air flow at tell-tale of vent 11AV1 is	ADEQUATE
		Air flow at tell-tale of vent 11AV2 is	ADEQUATE
	****	Air flow at tell-tale of vent 11AV3 is	ADEQUATE
	RECORD	Volume of air-flow at the inlet of fan 12XEF1	LFM
		Target flow value ($\pm 10\%$)	2078 LFM
	RECORD	Volume of air-flow at the upper inlet of fan 12XEF2	LFM
		Target flow value ($\pm 10\%$) is the sum of both ducts	1592 LFM
	VERIFY	Air flow at tell-tale of vent 12AV1 is	ADEQUATE
	VERIFY	Air flow at tell-tale of vent 12AV2 is	ADEQUATE
	VERIFY	Air flow at tell-tale of vent 12AV3 is	ADEQUATE
	RECORD	Volume of air-flow at the inlet of fan 12EF1	LFM
		Target flow value ($\pm 10\%$)	2078 LFM
	RECORD	Volume of air-flow at the inlet of fan 1EF1	LFM
		Target flow value (\pm 10%)	1592 LFM
	VERIFY	Air flow at tell-tale of vent 1AV1 is	ADEQUATE
	□ Check f	or Acceptance of Summary of air-flow at fan intakes and vents in sec	
		END OF TEST PROCEDURE	
TTL: Sig	gn for completi	on of initial testing:	
TTL: Sig	gn for complet	ion of final testing:	
		Date:/	